Hiker Use of Mountain Summits in Acadia National Park, 1997-1998

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INTRODUCTION

Acadia National Park offers spectacular and easily accessible hiking to more than 3 million visitors every year. Hiking is a popular activity with many of these visitors, but the park has little information about how many people hike, what trails they use, or the frequency of behaviors that may damage park resources.

Mountain summits in the park provide habitat for several species of rare plants that may be at risk from hiker traffic. The subalpine environment may be more sensitive to visitor use in general, and efforts to educate the hiking public about low impact or ALeave No Trace≅ principles have been limited. Rangers rarely patrol trails because of limited staff and a busy frontcountry. By estimating trail use now, even in a limited fashion, we can provide a baseline for future park managers to help protect resources and trail experiences.

This report describes the results of two efforts to monitor trail use. The first is a continuation of a volunteer summit steward program begun in 1995. Through this program, volunteers educate hikers about low impact ethics and techniques and conduct counts of hikers on various summits. We last reported on this program after the 1996 summer hiking season (Jacobi 1997). Here we describe the results of the volunteer's summit counts from 1997 and 1998. The second effort was the Friends of Acadia ridgerunner program. In 1998, ridgerunners conducted ten censuses (six-hour counts) of hiker use of Sargent Mountain, and those results are also presented here. Ridgerunners also educate hikers about low impact ethics.

METHODS

VOLUNTEER COUNTS

Data collection techniques were refined and improved for 1998 based on recommendations from earlier work (Jacobi 1997). Beginning in 1997, volunteers stopped collecting information about characteristics of visitors going off trail and began collecting data on group size. Group size was recorded in categories of 1-4, 5-8, or 9 or more. Volunteers also only recorded hours spent counting traffic at summits, not the hours for the entire hike. Summit observations and counts were usually made between 11:00 a.m. and 4:00 p.m. and lasted from 2-6 hours at a time. Direction of travel on summits was clarified for volunteers. Volunteers counted dogs on leash in addition to dogs off leash, and still counted them for the entire hike, including time observing at the summits. A sample data sheet is attached as Appendix 1.

Volunteers made most summit counts in July, August, and September, with a few in June and October. Nine mountain summits – Bald, Beech, Champlain, Dorr, Gorham, Parkman/Bald/Gilmore together, Parkman, Pemetic, and Sargent - were included in the counts (Figure 1). One count was also made on the South Ridge of Cadillac Mountain at the Featherbed.

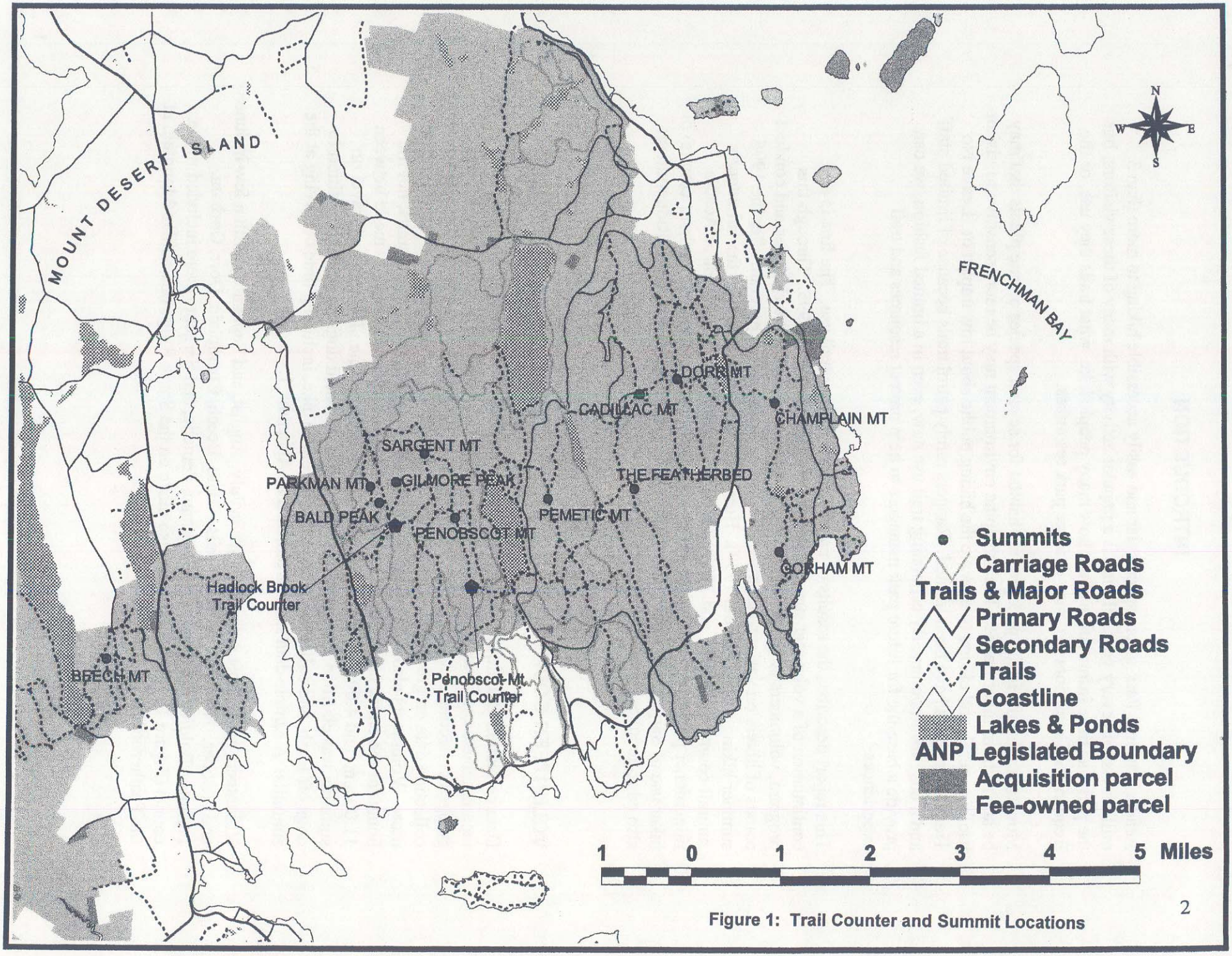

Figure 1: Trail Counter and Summit Locations

Volunteers were instructed to hike, and while en route to the summits, act as educators and sources of information for hikers. They were identified by volunteer uniforms while hiking. They performed the same function while descending. Hikes were taken when convenient to volunteer schedules and when the weather was good with an emphasis on being out between 10 a.m. and 3 p.m. when the park and trails are busiest. There was no effort made to sample hiking days randomly across the summer. Thus, we must be careful extrapolating the information available; it only represents the days volunteers hiked.

Upon arrival at their observation point (usually the summit cairn), volunteers went undercover, changing all clothing identifying their affiliation with the park. From this location they counted the number and direction of hikers arriving at and departing from the summit and incidents of off trail hiking (see Appendix 1).

For off trail hiking, volunteers knew trail locations and were told to be conservative classifying hikers as off trail. If there was any doubt, or the off trail travel was not significant, they were instructed not to record it. Volunteers made a judgment about whether off trail hiking was deliberate or inadvertent (losing the trail). They also recorded the apparent purpose of the off trail hiking on a check-off list developed from observations in previous years.

RIDGERUNNER CENSUSES

Censuses were conducted only on Sargent Mountain and ran from 10:00 a.m. to 4:00 p.m. Census days were selected semi-randomly, because they had to be integrated with several other ridgerunner projects with fixed schedules. For each census, ridgerunners took a 2-hour counting shift on the summit, and for the other four hours they built cairns and educated visitors on nearby summit trails. Ridgerunners used the same data sheet as the volunteers but did not record data about off trail hikers. Because they were not recording behaviors, they remained in their ridgerunner uniforms during the counts.

Two electronic trail counters were set up on approach trails to Sargent Mountain to try to develop an index of summit use. One counter was installed on the Jordan Ridge Trail about ¼ mile above the Around Mountain carriage road where the trail reached the ridgeline (Figure 1). The second was set up on the Hadlock Brook Trail about ¼ mile above the Waterfall Bridge (Figure 1). We intended for both to be easily accessible from the carriage road for quick checks. Ridgerunners checked trail counters several times weekly in addition to checking them at 10:00 a.m. and 4:00 p.m. on the census days. We paired the count from each trail counter for the six hours with the summit count for the same time. We then ran a regression on the paired data to see if trail counter data could be used to predict summit use.

RESULTS

VOLUNTEER COUNTS

Volunteers counted 2,161 hikers during 139 hours of observation on ten summits or groups of summits. Of the 68 dogs observed, 62% (n=42) were off leash. Four percent of hikers wandered off trail on the summits (n=93). Ninety percent of groups were of 4 persons or less (n=694); 10% were comprised of 5-8 persons (n=69) and only 1% of groups were of 9 or more persons.

Table 1 presents summary statistics for each mountain. More detailed information, including direction of travel data, can be found in Appendices 2 and 3.

Table 1: Summary Statistics of Visitor Use on Ten Mountain Summits in Acadia National Park for 1997-1998.

Location	Range of Obs. Dates	Obs. Days/ Obs. Hours	Avg. # of Obs. Hours	Total # Hikers	Avg. # Hikers/ Obs. Day	Avg. Hikers/ Hour	Max # Hikers
Bald	7/21	1 / 5.5	5.5	32	32	5.8	32
Beech	6/15-9/14	6 / 17	2.8	332	55	19.5	105
Champlain	7/9-7/29	2 / 5	2.5	59	30	11.8	48
Dorr	7/8-9/20	8 / 33	4.1	463	58	14.0	78
Featherbed	8/13	1 / 5	5	89	89	17.8	89
Gorham	7/17-10/25	7 / 18.5	2.6	595	85	32.2	168
Par/Bld/Gil	8/23	1 / 4.5	4.5	45	45	10.0	45
Parkman	7/21	1 / 5.5	5.5	40	40	7.3	40
Pemetic	7/11-9/6	7 / 31	4.4	350	50	11.3	84
Sargent	6/30-8/15	4 / 13.5	3.4	156	39	11.6	76

Comparisons with the 1995-1996 data for mountain summits (Jacobi 1997) are not useful because of the limited number of observations and the nonrandom selection of observation days. With several more years of data collection, we may be able to make some general conclusions about trends of summit use in general or for particular summits. We do note that 6% fewer people wandered off trail for any reason during 1997-98 as compared with 1995-96, but this is likely random variation rather than informed behavior.

Consolidating data from 1995-96 and 1997-98 is generally not useful because we adjusted our techniques, and thus consistency is lacking. However, we can group data on the number of hikers counted over this four year time span. This is worth reviewing even though we did not record the number of observation hours on summits in 1995-96. Table 2 shows hiker totals and averages for the summits for which we have data over this longer period. The average number of hikers reported for the four year period and the two year period are similar except for Beech Mountain (70 hikers vs. 55 hikers). There is probably a relatively high degree of variability in numbers because of weather and other factors. Appendix 4 contains information that is more detailed. Direction of travel data can also be grouped for the four year period. Details can be found in Appendix 5.

Table 2: Average and Total Number of Hikers Observed on Five Summits during the Summer Months, 1995-1998.

Summit	Total # Hikers	Average # Hikers	Max # Hikers	# of Observations
Beech	774	70	129	11
Dorr	954	50	78	19
Gorham	900	90	168	10
Pemetic	779	43	84	18
Sargent	737	41	76	18

RIDGERUNNER CENSUSES

Ridgerunners conducted nine of the ten scheduled censuses. One was cancelled because of rain, and another was cut short one hour for the same reason. Table 3 shows the dates of observation, the trail counter counts at the Sargent South Ridge and Hadlock Brook sites, and the summit counts.

Table 3: Electronic Trail Counter and Ridgerunner Census Counts for Sargent Mountain in July and August, 1998: 10:00 a.m. to 4:00 p.m.

Date	Sargent South Ridge Trail Counter Count	Hadlock Brook Trail Counter Count	Summit Census Count
07/17/98	86	4	41
07/12/98	51	26	53
07/15/98	79	12	42
07/18/98	123	40	71
07/19/98	105	21	78
07/21/98	184	28	55
07/27/98	140	28	78
08/17/98		21	48
08/23/98	132	19	62

Results of the regression analysis showed an r^2 of 0.16 for the Sargent South Ridge Trail Counter and 0.61 for the Hadlock Brook Counter. Detailed regression statistics are found in Appendix 6. Neither counter is useful for predicting summit use based on these results.

The number of hikers reaching the summit on these nine days was 528, and the average was 59. The 95% confidence interval for the mean is 59 +/- 28, or 31-87 hikers. The average of 59 by ridgerunner censuses is 20 more than the average obtained from volunteer observations. Volunteer observation periods averaged 3.4 hours; ridgerunners counted for six hours every time but one. The average number of summit hikers observed by these different programs seems consistent given the hours of observation. The average number of hikers observed per hour is also comparable: 11.55 for volunteers, 9.96 for ridgerunners.

DISCUSSION

We will continue the ridgerunner and volunteer summit steward programs in 1999 with some minor modifications. The ridgerunners main function, contacting visitors, is easily combined with census taking. Ridgerunners will still maintain electronic trail counters in the same locations. We will combine ridgerunner data for 1998 and 1999 to see if a stronger regression relationship emerges from the extra data points. Even if such a relationship does not emerge, the program is still useful because it gives us ten comprehensive censuses of use. These censuses may be compared from year to year to detect trends in use, especially if census days are selected randomly.

Volunteer stewards will continue to collect data from several summits as before. The focus on Beech, Dorr, Gorham, Pemetic, and Sargent Mountains will continue, and a greater effort will be made on Champlain Mountain, Acadia Mountain, and the Beehive as well. We will limit the observation period to 3 hours maximum between 11:00 a.m. and 3:00 p.m., because sometimes volunteers spent more hours than necessary conducting summit counts.

REFERENCES

Jacobi, C.

1997 Hiker use of six mountain summits in Acadia National Park, 1995-1996. Acadia National Park Natural Resources Report 97-02. 17pp.